

REMARKS

In the Office Action, the Examiner rejected claims 27-47 under § 103 as being unpatentable over USP 5,578,840 issued to Scepanovic, et al. (Scepanovic) in view of USP 6,230,306 issued to Raspopovic, et al. (Raspopovic). In this Amendment, Applicants have amended claims 27, 37, 42, 46, and 47. No claims have been added or canceled. Accordingly, claims 27-47 will be pending after entry of this Amendment.

I. Rejection to Claims 27-36

The Examiner rejected claims 27-36 under § 103 as being unpatentable over Scepanovic, in view of Raspopovic.

Claims 28-36 are dependent directly or indirectly on independent claim 27. Claim 27 recites a method of pre-computing routes for nets. Prior to performing a routing operation, this method defines a set of partition lines for partitioning, during the routing operation, a region of an integrated circuit ("IC") layout into several sub-regions. For a set of potential sub-regions, the method identifies a set of at least two routes that traverse the set of potential sub-regions. At least one of the routes has at least one diagonal edge. The method stores the identified routes for use during the routing operation.

Applicants respectfully submit that the cited references neither separately nor in combination disclose, teach, or even suggest such a method. The Examiner identifies the Abstract, Figures 5-9, and 15, and column 1, lines 15-23 of Scepanovic as disclosing the method of claim 27. These passages of Scepanovic, however, do not disclose, teach, or even suggest a method for

pre-computing routes prior to performing routing. In this amendment, Applicants have amended claim 27 to further clarify that the recited method is performed as a pre-computation operation that occurs prior to the routing operation. Specifically, amended claim 27 recites a method that (1) defines, prior to performing a routing operation, a set of partitioning lines for partitioning a region of an IC layout into several sub-regions during a routing operation, (2) identifies at least two routes that traverse a set of potential sub-regions, and (3) stores the identified routes for later use during the routing operation. These cited passages of Scepanovic clearly do not disclose, teach, or even suggest pre-tabulating multiple routes for a set of sub-regions before performing a routing operation.

The Examiner identifies column 17, table 11 of Raspanovic as disclosing the storing of the identified routes, where the stored routes are for use during the routing operation limitation of claim 27. These passages of Raspanovic, however, do not disclose storing multiple routes for a set of sub-region, where the routes were identified prior to the routing operation. Therefore, Raspanovic does not disclose, teach, or even suggest the recited method of claim 27.

Accordingly, Applicants respectfully submit that the cited references do not render claim 27 unpatentable. As claims 28-36 are dependent on claim 27, Applicants respectfully submit that claims 28-36 are patentable over the cited references for at least the same reasons as claim 27. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103 rejection of claims 27-36.

II. Rejection to Claims 37-41

The Examiner rejected claims 37-41 under § 103 as being unpatentable over Scepanovic, in view of Raspopovic.

Claims 38-41 are dependent directly or indirectly on independent claim 37. Claim 37 recites a method of pre-computing routes for connecting sub-regions. This method is for a router that uses a set of partitioning lines to partition an IC layout region into several sub-regions, which have several paths between them. For each particular combination of two or more sub-regions, this method identifies at least one route for connecting the particular combination of sub-regions. This identification is performed before a routing operation. The method identifies the routing paths used by each identified route. Some of the identified routing paths are diagonal. The method stores the identified routing paths for each identified route in a storage structure for use during the routing operation.

Applicants respectfully submit that cited references neither separately nor in combination disclose, teach, or even suggest such a method. The Examiner identified the Abstract, Figures 5-9, and 15, column 1, lines 15-23, and column 10, lines 5-10 of Scepanovic, and column 17, table 11 of Raspanovic, as invalidating the method of claim 37.

However, these cited passages of the references do not disclose a method that pre-tabulates at least one route for each particular combination of sub-regions. Initially, Applicants note that neither of the cited references disclose, teach, or even suggest pre-tabulating routes for each particular combination of sub-regions. In this amendment, Applicants have also amended claim 37 to further clarify that the recited method is performed as a pre-computation operation

that occurs prior to the routing operation. In particular, Applicants have amended claim 37 to recite that the identification and storage of the at least one route for each combination is performed before a routing operation. The cited passages of the references do not disclose, teach, or even suggest such pre-computation operations.

Accordingly, Applicants respectfully submit that the cited references do not render claim 37 unpatentable. As claims 38-41 are dependent on claim 37, Applicants respectfully submit that claims 38-41 are patentable over the cited references for at least the same reasons as claim 37. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103 rejection of claims 37-41.

III. Rejection to Claims 42-45

The Examiner rejected claims 42-45 under § 103 as being unpatentable over Scepanovic, in view of Raspopovic.

Claims 43-45 are dependent directly on independent claim 42. Claim 42 recites a method of pre-computing routes for connecting sub-regions for a router that uses a set of partitioning lines to partition an IC layout region into several sub-regions, which have several edges between them. For each particular combination of at least two sub-regions, the method identifies, before a routing operation, at least one routing graph for connecting the particular combination of sub-regions. The method also identifies the edges intersected by each routing graph identified for the particular combination of sub-regions. Some of the identified edges are diagonal. The method stores the identified edges for each routing graph identified for the particular combination of sub-

regions in a storage structure. The method stores the edges for later use during the routing operation.

Applicants respectfully submit that cited references neither separately nor in combination disclose, teach, or even suggest such a method. As mentioned above, the cited passages of the references do not disclose a method that pre-tabulates information about at least one route for each particular combination of sub-regions. Initially, Applicants note that neither of the cited references disclose, teach, or even suggest pre-tabulating routes for each particular combination of sub-regions. In this amendment, Applicants have also amended claim 42 to further clarify that the recited method is performed as a pre-computation operation that occurs before the routing operation. In particular, Applicants have amended claim 42 to recite that the identification and storage operations are performed before the routing operation. The cited passages of the references do not disclose, teach, or even suggest such pre-computation operations.

Accordingly, Applicants respectfully submit that the cited references do not render claim 42 unpatentable. As claims 43-45 are dependent on claim 42, Applicants respectfully submit that claims 43-45 are patentable over the cited references for at least the same reasons as claim 42. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103 rejection of claims 42-45.

IV. Rejection to Claims 46

The Examiner rejected claim 46 under § 103 as being unpatentable over Scepanovic, in view of Raspopovic.

Claim 46 recites a method of pre-computing routes. Before the routing operation, this method defines a set of partition lines for partitioning, during the routing operation, a region of an IC layout into several sub-regions. These sub-regions have several $\pm 45^\circ$ diagonal edges and several Manhattan edges between them. For a set of potential sub-regions, the method identifies at least two routes that traverse the set of potential sub-regions. At least one of the routes utilizes at least one diagonal edge and one Manhattan edge. The method stores the identified routes for use during the routing operation.

Applicants respectfully submit that the cited references neither separately nor in combination disclose, teach, or even suggest such a method. As mentioned above, the cited passages of the references do not disclose a method that pre-computes at least two routes for a set of sub-regions. Moreover, in this amendment, Applicants have amended claim 46 to further clarify that the recited method is performed as a pre-computation operation that occurs before the routing operation. In particular, Applicants have amended claim 46 to recite that the identification and storage operations are performed before the routing operation. The cited passages of the references do not disclose, teach, or even suggest such pre-computation operations.

Accordingly, Applicants respectfully submit that the cited references do not render claim 46 unpatentable. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103 rejection of claim 46.

V. Rejection to Claims 47

The Examiner rejected claim 47 under § 103 as being unpatentable over Scepanovic, in view of Raspopovic.

Claim 47 recites a method of pre-computing routes. Before the routing operation, this method defines a set of partition lines for partitioning, during the routing operation, a region of an IC layout into several sub-regions. These sub-regions have several $\pm 45^\circ$ diagonal paths and several Manhattan paths between them. For a set of potential sub-regions, the method identifies a set of routes that traverse the set of potential sub-regions. At least one of the routes utilizes at least one diagonal path and one Manhattan path. The method stores the identified routes for use during the routing operation.

Applicants respectfully submit that the cited references neither separately nor in combination disclose, teach, or even suggest such a method. As mentioned above, the cited passages of the references do not disclose a method that pre-computes at least two routes for a set of sub-regions. Moreover, in this amendment, Applicants have amended claim 47 to further clarify that the recited method is performed as a pre-computation operation that occurs before the routing operation. In particular, Applicants have amended claim 47 to recite that the identification and storage operations are performed before the routing operation. The cited passages of the references do not disclose, teach, or even suggest such pre-computation operations.

Accordingly, Applicants respectfully submit that the cited references do not render claim 47 unpatentable. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §103 rejection of claim 47.

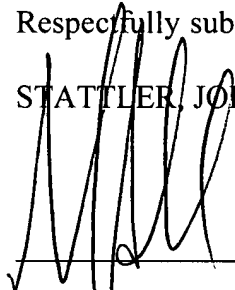
CONCLUSION

In view of the foregoing, it is submitted that all pending claims, namely claims 27-47 are in condition for allowance. Reconsideration of the rejections and objections is requested. Allowance is earnestly solicited at the earliest possible date.

Dated: 10/19/04

Respectfully submitted,

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